REMARKS

This amendment, submitted in response to the Office Action dated June 12, 2002, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

As a preliminary matter, the Examiner has objected to Fig. 16 for including a reference numeral not described in the specification. An amendment to the specification is provided to conform the specification with the drawings. No new matter is raised.

The specification, claims and abstract are also objected to for containing informalities. Amendments to obviate these objections are set forth above.

Turning to the merits of the Office Action, claims 1-8 remain pending in the application. Claims 4-8 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 1, 4 and 8/4 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Newman et al. (U.S.P. 5,420,441, hereafter "Newman"). Claims 2-3, 5-6, 8/5 and 8/6 have been rejected under 35 U.S.C. § 103 as being obvious over Newman in view of Grillet (U.S.P. 5,591,968). Claim 7 has been deemed allowable over the art of record but has been objected to for depending on a rejected base claim. Applicant respectfully submits the following arguments in traversal of the prior art rejections.

To expedite prosecution of this case, Applicant has cancelled claims 1 and 4 and has rewritten claims 2 and 5 in independent form and rewrites the dependencies of claims 7 and 8.

With regard to the Section 103 rejection, Applicant submits the following comments.

Applicant's invention relates to a method and plate for analyzing stray light of a radiation image reader. Known image reading apparatus include an optics system including lenses for directing a stimulating light towards the surface of a photostimulable phosphor sheet. It is possible that light reflected back from the sheet surface becomes re-reflected by the optics system, thereby creating stray light. Applicant's invention is directed to a method and analyzing plate for analyzing for the presence of such stray light.

Fig. 12 of the application shows an exemplary embodiment of an analyzing image of the invention. The image 24 includes a density pattern having a boundary line 24C between a low-density region 24A and a high-density region 24B. The boundary line is inclined with respect to the horizontal scanning direction applied by the reader of the analyzing image 24. The high and low density regions have a contrast difference of at least 1:20, and preferably 1:50 to detect stray light.

Turning to the cited art, Newman relates generally to forming an analyzing plate to calibrate and objectively determine the quality of a radiation image reader. A lead mask is used to form a reference image, where the lead mask has varying levels of transmissivity to x-rays. Col. 8, lines 39-40.

Grillet relates to an imaging plate for testing a scanning device. The test image includes a set of horizontal lines 46 to test for Moire patterns occurring in a detected image, and a set of Mire patterns 37. The Mire pattern comprises a set of circles and octagons having lines disposed in different orientations. However, these lines do not correspond to separation of areas of

different density. The test pattern comprises a black printed pattern over a transparent sheet. Col. 3, lines 42-45. The pattern is transparent to x-rays but opaque to visible light.

The Examiner contends that the combination of Newman and Grillet teaches or suggests each feature of claims 2 and 5, as originally filed. Applicant would maintain that the rejection is not supported for at least three reasons.

First, as an initial matter, the Examiner has offered no explanation as to why one skilled in the art would be motivated to combine the features of Newman and Grillet. The Examiner merely concludes that different test images are known. However, the fact that references may be directed to related subjects is a necessary condition for combination, but it is not a sufficient reason for combining the two references in this case. By failing to provide any motivation for combining the references, the Examiner is clearly engaging in impermissible hindsight reconstruction.

Second, as a related matter, Applicant argues that the teachings of the references teach away from their combination. Newman creates a pattern by providing materials that are opaque, i.e. do not transmit x-rays to varying degrees. By contrast, Grillet creates a pattern by providing a pattern that is made of a material that is transparent, i.e. does transmit x-rays. The references teach completely opposite approaches for test plate formation, and thus teach away from their combination with each other.

Third, even assuming arguendo, that the references can be combined, the combination does not teach each feature of claims 2 and 5. Each of these claims describe a boundary region between high and low density regions as defined by an inclined boundary line. Assuming some

diagonal line is shown in Grillet, this does not correspond to a boundary between high and low density areas. Applicant would further submit that because Grillet creates patterns that are transparent to the x-rays, the formed pattern is of a uniform density. The test pattern would only emerge upon scanning. Therefore, contrary to the Examiner's contention, the combination does not teach or suggest each feature of claims 2 and 5 as originally filed. Should any additional reference be applied against these claims, the rejection must be made on a non-final basis.

Applicant has added claims 9-10 to describe the invention more particularly. Claim 11 is added to include the subject matter of allowable claim 7, as dependent on original claim 4.

In view of the above, Applicant submits that claims 2, 3 and 5-11 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any informalities.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/801,773

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Susan Perng Pan
Registration No. 41,239

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: September 11, 2002

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 11, last paragraph bridging page 12, delete and insert the following:

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will hereinafter be described in detail with reference to the drawings. As illustrated in Fig. 1, a radiation image reader 1 is equipped with conveyor rollers 9a, 9b for conveying a storable fluorescent sheet 4 in the direction of arrow y. The rollers 9a, 9b are rotated by a motor (not shown), and the storable fluorescent sheet 4 has stored and recorded a radiation image. Above the sheet 4 that is conveyed, an optics unit 10 is disposed for emitting laser light 11 being excitation light. The laser light 11 scans the sheet 4 in the horizontal scanning direction perpendicular to the paper surface. Above the position where the sheet 4 is scanned in the horizontal scanning direction with the laser light 11, a collective guide 14, for collecting the photostimulated luminescent light 13 emitted from the sheet 4 by the horizontal scanning of the laser light [14] <u>11</u>, is disposed in proximity to the conveying passage of the sheet 4. Near the collective guide 14, a collective mirror 7 is disposed for reflecting the photostimulated luminescent light 13, scattered and emitted from the storable fluorescent sheet 4, toward the collective mirror 7. The collective mirror 7 is supported by a mirror mount 6. The collective guide 14 is connected with a photomultiplier 15, which photoelectrically detects the photostimulated luminescent light 13. This photomultiplier 15 is connected to a logarithmic amplifier 16, which is in turn connected to an A/D converter 17. The A/D converter 17 is

connected to storage means 18, which is in turn connected to image processing means 19.

Page 14, last paragraph bridging page 15, delete and insert the following:

Here, stray light will be described in detail with reference to Figs. 3 and 4. Note that in Fig. 3, the laser light 11, reflected toward the sheet 4 by the cylindrical mirror 48, and the laser light 11 before reflection, are in the same plane for the purpose of explanation. As illustrated in Figs. 3 and 4, the laser light 11 is reflected toward the sheet 4 by the cylindrical mirror 48 and is projected at position P1 on the sheet 4. The laser light 11 projected at the position [P] <u>P1</u> is reflected at the surface of the sheet 4 toward the cylindrical mirror 48 and is further reflected at the cylindrical mirror 48 toward the cylindrical lens 50. Then, the laser light 11 reflected toward the cylindrical lens 50 is reflected as stray light 11' at the surface of the cylindrical lens 50 toward the sheet 4. Because the laser light 11 is incident on the sheet 4 at an angle to an optical axis X, as illustrated in Fig. 3, the stray light 11' is projected at position P2 away from position P1.

Page 16, last paragraph bridging page 17, delete and insert the following:

Now, a method of generating the storable fluorescent inspection sheet 21 will be described in detail with reference to Fig. 8. As illustrated in Fig. 8A, the region 2iAof a storable fluorescent sheet 21' having stored and recorded no radiation image is shielded with a radiation shielding plate 71 (e.g., a lead plate of thickness 5 mm), and the unshielded region [20B] <u>21B</u> of the sheet 21' is illuminated with radiation 72 with a dose of 50 mR, emitted from a radiation source 70. Then, as illustrated in Fig. 8B, the region 21B is shielded with the shielding plate 71, and the unshielded region [20A] <u>21A</u> is illuminated with radiation 72 with a dose of 1 mR, emitted from the radiation source 70. In this manner, the storable fluorescent inspection sheet 21

having stored and recorded the radiation inspection image 20 can be obtained as illustrated in Fig. 6.

Page 21, last paragraph bridging page 22, delete and insert the following:

Fig. 16 illustrates how stray light is inspected by use of the storable fluorescent inspection sheet 21. Assume that in the radiation image reader 1, stray light develops at the position P7 shown in Fig. 16 during reading at the position P8. As illustrated in Fig. 16, a low-density region 29A and a high-density region 29B develop in an image 29, obtained by reading the storable fluorescent inspection sheet 21. In the case where the positions P7 and P8 on a certain horizontal scanning line are both in the high-density region 28B of the radiation inspection image 28, noise resulting from stray light is inconspicuous. However, in the case where the horizontal scanning line is moved by vertical scanning during reading of the storable fluorescent inspection sheet 21, and the position P8 is in the low-density region 28A and the position P7 in the high-density region 28B, noise 23 in the form of a line extending in the vertical scanning direction will develop at the position in the image 29 that corresponds to the position PB in the low-density region 29A. Therefore, using the storable fluorescent inspection sheet 21 having stored and recorded the radiation inspection image 28 that has the density pattern shown in Fig. 15, stray light can be inspected no matter what position stray light develops at. In the image 29 obtained from a storable fluorescent inspection sheet 21 like this, if the intersection between the horizontal scanning line, passing through point P8' where the noise 23 disappears, and the boundary line [27C] <u>29C</u> (between the low-density region 29A and the high-density region 29B) is expressed in terms of P7', the intersection P7' represents the position at which stray light develops. Therefore, the position where stray light develops can also be found by use

of the storable fluorescent inspection sheet 21 having stored and recorded the radiation inspection image 28 shown in Fig. 15.

IN THE CLAIMS:

Cancel claims 1 and 4 without prejudice or disclaimer.

The claims are amended as follows:

2 (Amended). [The inspection method as set forth in claim 1] A method of inspecting influence of stray light which occurs in a radiation image reader equipped with horizontal scanning means for scanning excitation light on a storable fluorescent sheet, having stored and recorded a radiation image, in a horizontal scanning direction, vertical scanning means for scanning said storable fluorescent sheet in a vertical scanning direction approximately perpendicular to said horizontal scanning direction, and reading means for obtaining an image signal which represents said radiation image by photoelectrically reading said radiation image, stored and recorded in said storable fluorescent sheet, by the horizontal scanning of said excitation light; said inspection method comprising the steps of:

preparing a storable fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 are arrayed in said horizontal scanning direction;

obtaining an image inspection signal representing said radiation inspection image, by photoelectrically reading said radiation inspection image from said storable fluorescent inspection sheet with said reading means; and

inspecting said influence of stray light, based on an image reproduced from said image inspection signal, wherein a boundary line, in said radiation inspection image, between said low-density region and high-density region is constructed by a straight line and is inclined with respect to said horizontal scanning direction so that it intersects both edges of said radiation inspection image which extend in said vertical scanning direction.

6 (Amended). [The] A storable fluorescent inspection sheet [as set forth in claim 4] having stored and recorded a radiation inspection image that has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 are arrayed in a horizontal scanning direction, wherein a boundary line, in said radiation inspection image, between said low-density and high-density regions is constructed by a straight line and is inclined with respect to said horizontal scanning direction so that it intersects both edges of said radiation inspection image which extend in [said] a vertical scanning direction.

7 (Amended). A method of generating the storable fluorescent inspection sheet as set forth in any one of claims [4] 5 through 6, comprising the steps of:

disposing a radiation shielding member at a position corresponding to said density pattern on a storable fluorescent sheet;

illuminating said storable fluorescent sheet, on which said shielding member has been disposed, with a dose of radiation that corresponds to said contrast difference; and

storing and recording said radiation inspection image in said storable fluorescent sheet, by repeating the disposition of said radiation shielding member and the illumination of said radiation, with respect said storable fluorescent sheet until said density pattern is obtained.

8 (Amended). A method of generating the storable fluorescent inspection sheet as set

forth in any one of claims [4] 5 through 6, comprising the steps of:

disposing a radiation transmittable member at a position corresponding to said density pattern on a storable fluorescent sheet, the radiation transmittable member having a radiation transmission factor which corresponds to said contrast difference; and

storing and recording said radiation inspection image in said storable fluorescent sheet, by illuminating said storable fluorescent sheet, on which said radiation transmittable member has been disposed, with a dose of radiation that corresponds to said contrast difference.

Claims 9-11 are added as new claims.

9. A method of inspecting influence of stray light which occurs in a radiation image reader equipped with horizontal scanning means for scanning excitation light on a storable fluorescent sheet, having stored and recorded a radiation image, in a horizontal scanning direction, vertical scanning means for scanning said storable fluorescent sheet in a vertical scanning direction approximately perpendicular to said horizontal scanning direction, and reading means for obtaining an image signal which represents said radiation image by photoelectrically reading said radiation image, stored and recorded in said storable fluorescent sheet, by the horizontal scanning of said excitation light; said inspection method comprising the steps of:

preparing a storable fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:50 are arrayed in said horizontal scanning direction;

obtaining an image inspection signal representing said radiation inspection image, by photoelectrically reading said radiation inspection image from said storable fluorescent inspection sheet with said reading means; and

inspecting said influence of stray light, based on an image reproduced from said image inspection signal.

10. A storable fluorescent inspection sheet having stored and recorded a radiation inspection image that has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:50 are arrayed in a horizontal scanning direction.

11. A method of generating a storable fluorescent inspection sheet having stored and recorded a radiation inspection image that has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 are arrayed in a horizontal scanning direction comprising:

disposing a radiation shielding member at a position corresponding to said density pattern on a storable fluorescent sheet;

illuminating said storable fluorescent sheet, on which said shielding member has been disposed, with a dose of radiation that corresponds to said contrast difference; and

storing and recording said radiation inspection image in said storable fluorescent sheet, by repeating the disposition of said radiation shielding member and the illumination of said radiation, with respect said storable fluorescent sheet until said density pattern is obtained.

IN THE ABSTRACT OF DISCLOSURE:

The abstract is changed as follows:

[Disclosed herein is a method of inspecting influence of stray light which occurs in a radiation image reader.] The inspection method comprises [the steps of]: preparing a storage fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 are arrayed in a horizontal scanning direction; obtaining an image inspection signal representing the radiation inspection image, by [photelectrically] photoelectrically reading the radiation inspection image from the storable fluorescent inspection sheet; and inspecting the influence of stray light, based on an image reproduced from the image inspection signal. An inspection image plate has contrast differences of high-density and low-density regions of at least 1:20.